



DECLARATION

I, Nobuhiko Ikeda, of SHIGA INTERNATIONAL PATENT OFFICE, 3-1, Yaesu 2-chome, Chuo-ku, Tokyo, Japan, understand both English and Japanese, am the translator of the English document attached, and do hereby declare and state that the attached English document contains an accurate translation of the official certified copy of Japanese Patent Application No. 2000-019184 that all statements made herein are true to the best of my knowledge.

Declared in Tokyo, Japan

This 28th day of November, 2003

A handwritten signature of Nobuhiko Ikeda in cursive script, written over a horizontal dashed line.

Nobuhiko Ikeda

[Document Type] Specification

[Title of the Invention] Portable Radio Communication

Apparatus

[Claims]

- 5 1. A portable radio communication apparatus which has a sound input device for inputting sound, a sound output device for outputting sound, an input device for inputting various signals, and a communication device for communicating various communication data such as audio data, text data, and image data, the portable radio communication apparatus including:
- 10 a first case,
- a second case which is rotatably connected to the first case and which can be in open and closed positions with respect to the first case,
- 15 a first display which is exposed when the second case is in the open position,
- a second display which is exposed whether the second case is in the open or closed position,
- wherein the first display and the second display are
- 20 constituted by a unitary display device which can display on both a front side and a back side.
2. A portable communication apparatus according to claim 1, wherein the display device is provided in either the first case or the second case, and the first case or the second case
- 25 in which the display device is provided has a window for the first display in the inner face and has a window for the second display in the outer face.

3. A portable radio communication apparatus according to claim 2, wherein a reflective plate is provided in the display device on the opposite side to the window for the first display and on the opposite side to the window for the second display.

[0001]

[Technical Field of the Invention]

The present invention relates to portable radio communication apparatuses which employ various communication systems, and in particular, the present invention relates to foldable portable radio communication apparatuses.

[0002]

[Prior Art]

Recently, portable communication apparatuses which employ communication systems which enable high-speed transmission of data, such as PDC (Personal Digital Cellular), CDMA (Code Division Multiple Access), GSM (Global System for Mobile Communication), and PHS (Personal Handy-phone System), are widely used. In addition, communication systems of the technologies of the next generation, such as WCDMA (Wide-band CDMA) and CDMA2000 are under development.

Among these types of portable radio communication apparatuses, ones having foldable structures so as to improve portability are known. However, a display section of such a portable radio communication apparatus of foldable type can not be seen from the outside when it is folded.

Therefore, there are portable radio communication

apparatuses having structures such that the display function is maintained even when they are folded, which are provided with secondary display sections which can be seen from the outside even when the portable radio communication apparatuses are folded, as described in Japanese Unexamined Patent Application, First Publication (Kokai), No. Hei 6-37697.

[0003]

[Problems to be Solved by the Invention]

However, in a portable radio communication apparatus of this structure, there has been a problem that the number of parts increases by the provision of the secondary display section, which causes an increase in the size of the case and damages the portability.

In particular, in order to allow each display section to display an image independently, each display section requires a driver which makes the display section display the image, and therefore the number of parts further increases, and the increase in the size was unavoidable.

[0004]

The present invention was achieved in view of the above circumstances, and the object is to provide a portable radio communication apparatus which can be produced with a reduced size without damaging portability, and which allows a user to check the display even when the apparatus is folded.

[0005]

[Means for Solving the Problem]

In order to achieve the above object, the portable radio

communication apparatus according to claim 1 is a portable radio communication apparatus which has a sound input device for inputting sound, a sound output device for outputting sound, an input device for inputting various signals, and a communication device for communicating various communication data such as audio data, text data, and image data, the portable radio communication apparatus including:

a first case,

a second case which is rotatably connected to the first case and which can be in open and closed positions with respect to the first case,

a first display which is exposed when the second case is in the open position,

a second display which is exposed whether the second case is in the open or closed position,

wherein the first display and the second display are constituted by a unitary display device which can display on both a front side and a back side.

[0006]

Thus, since the first display and the second display are constituted by a unitary display device which can display on both the front side and the back side, the number of parts can be largely reduced in comparison with the case where display devices are respectively provided in order to provide two displays, and drivers are respectively provided in order to display on the display devices, allowing a smaller and thinner design, and thereby a portable radio communication apparatus

which has a full display function and improved portability can be produced.

[0007]

The portable radio communication apparatus according to claim 2, wherein the display device is provided in either the first case or the second case, and the first case or the second case in which the display device is provided has a window for the first display in the inner face and has a window for the second display in the outer face in the portable radio communication apparatus according to claim 1.

[0008]

In this case, the displayed contents on the display device disposed in the case can be checked through the window for the first display provided in the inner face of the first case or the second case and through the window for the second display provided in the outer face of the case. The structure in which only a unitary display device is disposed in the case allows a thinner design of the case which is provided with displays on the inner and outer faces.

[0009]

The portable radio communication apparatus according to claim 3, wherein a reflective plate is provided in the display device on the opposite side to the window for the first display and on the opposite side to the window for the second display in the portable radio communication apparatus according to claim 2.

[0010]

In this case, the reflective plates provide extremely fine display on the unitary display device through each of the windows in the inner and outer faces.

[0011]

5 [Embodiments of the Invention] A portable radio communication apparatus of an embodiment of the present invention will be described in the following with reference to the drawings.

In Figs. 1 and 2, reference numeral 1 indicates a
10 portable radio communication apparatus. This portable radio communication apparatus has a first case 2 and a second case 4 which is rotatably connected to the upper portion of the first case 2 by a hinge 3. By rotating the second case 4 around the connection by the hinge 3, the second case 4 can be in open
15 and closed positions with respect to the first case 2.

That is, by rotating the second case 4 from the closed position (the position shown in Fig. 2), the second case 4 comes to the open position (the position shown in Fig. 1). In contrast, by rotating the second case 4 in the open position
20 to the opposite direction, the second case 4 comes to the closed position.

[0012]

On the front side of the second case 4, which is a side to be put on the first case 2 when the second case 2 is in the
25 closed position, a main display section (first display) 11 is provided. In addition, on the back side of the second case 4, a sub-display section (second display) 12 is provided. The

main display section 11 and the sub-display section 12 are constituted by liquid crystal display panels which are disposed in the positions facing a window 11a for the main display section (window for the first display) and a window 12a for the sub-display section (window for the second display), respectively. Various contents can be displayed on the main display section 11 and the sub-display section 12.

In the upper portion on the front side of the second case 4, a speaker (sound output device) 13 is provided.

10 [0013]

On the front side of the first case 2, which is to be closed by the second case 4, a plurality of operation keys (input device) 14 are provided, using which various inputting operations can be carried out.

15 In the lower portion on the front side of the first case 2, a microphone (sound input device) 15 is provided. In addition, in the vicinity of the upper portion on the back side, a retractable antenna 16 is provided, by which communication of various data such as audio data, text data, image data, and the like can be carried out.

20 [0014]

With this portable radio communication apparatus 1, when the second case 4 is in the open position, input of sound is carried out using the microphone 15, and the speaker 13 emits the voice of the opposite party, the alert sounds, alarms and the like.

25 [0015]

Next, functions of the above portable radio communication apparatus 1 will be described with reference to a functional block diagram shown in Fig. 3.

In the drawings, reference numeral 21 indicates a display device. This display device is disposed in a second case 4. This display device 21 is constituted by a unitary liquid crystal display panel, which, in particular, has a structure capable of displaying on both a front side and a back side, that is, it can display on both the front and back sides. The display device 21 is provided with a reflective plate 22 for the main display section and a reflective plate 23 for the sub-display section on the front and back sides. A portion where the reflective plate 22 for the main display section of this display device 21 is provided is a main display device portion 21a, which constitutes the main display section 11, and a portion where the reflective plate 23 for the sub-display section of this display device 21 is provided is a sub-display device portion 21b, which constitutes the sub-display section 12, being disposed so as to face a window 11a for the main display section, which is formed in the front surface of the second case 4, and a window 12a for the sub-display section, which is formed in the back surface of the second case 4, respectively.

[0016]

The display device 21 is provided with a display driver 24 at an end, with which the display device 21 can display contents.

The display driver 24 is connected to a control section 25 which is provided in the first case 2. The control section 25 outputs control signals.

[0017]

5 A radio section (communication device) 26 sends and receives various data, such as audio data, text data, and image data, to and from the terminal of the opposite party via the antenna 16 using a radiocommunication network.

From the communication data received by the radio section 10 26, audio data is separated by a sound processing section, which is not shown in the drawings, and the sound is emitted from the speaker 13. The sound input by the microphone 15 is input as a sound signal into the sound processing section, where the sound signal is converted into audio data, and the 15 audio data are sent as communication data to the radio section 26, from which the communication data can be sent to the terminal of the opposite party via the antenna 16.

Reference numeral 27 indicates a battery, which supplies all electric power for the portable radio communication 20 apparatus 1.

[0018]

With the above portable radio communication apparatus 1, the display driver 24 is driven by control signals from the control section 25, and the display device 21 displays a 25 variety of text-based information and image-based information.

Contents displayed by the main display device portion 21a of the display device 21 can be viewed through the window 11a

for the main display section, and contents displayed by the sub-display device portion 21b of the display device 21 can be viewed through the window 12a for the sub-display section.

That is, the display contents of the main display device portion 21a are displayed on the main display section 11, and
5 the display contents of the sub-display device portion 21b are displayed on the sub-display section 12.

[0019]

Accordingly, when the second case 4 is in the open
10 position, contents displayed on the main display section 11 and the sub-display section 12 can be checked, and when the second case 4 is in the closed position, the contents displayed on the sub-display section 12 can be checked.

[0020]

15 Thus, since the main display section 11 and the sub-display section 12 are constituted by the unitary display device 21 which can display on both the front side and the back side in the above portable radio communication apparatus 1, the number of parts can be largely reduced in comparison
20 with the case where display devices are respectively provided in order to provide two display sections, , and drivers are respectively provided in order to have the devices display, allowing a smaller and thinner design, and thereby the portable radio communication apparatus 1 which has a full
25 display function and improved portability can be produced.

[0021]

In addition, through the window 11a for the main display

section formed in the front side of the second case 4, and through the window 12a for the sub-display section formed in the back side of the second case 4, contents displayed by the display device 21, which is disposed in the second case 4, can
5 be easily checked.

Moreover, the reflective plate 22 for the main display section and the reflective plate 23 for the sub-display section provide extremely fine view of the contents displayed by the display device 21 through the window 11a for the main
10 display section and the window 12a for the sub-display section.

In the above example, the display device 21 is disposed in the second case 4 so that the second case 4 has the main display section 11 and the sub-display section 12; however,
15 the display device 21 may be disposed in the first case 2 so that the first case 2 has the main display section 11 and the sub-display section 12.

[0022]

[Effects of the Invention]

20 As explained above, the following effects are obtainable from the portable radio communication apparatus of the present invention.

According to the portable radio communication apparatus of claim 1, since the first display and the second display are
25 constituted by a unitary display device which can display on both the front side and the back side, the number of parts can be largely reduced in comparison with the case where display

devices are respectively provided in order to provide two displays, and drivers are respectively provided in order to display on the display devices, allowing a smaller and thinner design, and thereby a portable radio communication apparatus
5 which has a full display function and improved portability can be produced.

[0023]

According to the portable radio communication apparatus of claim 2, the displayed contents on the display device
10 disposed in the case can be checked through the window for the first display provided in the inner face of the first case or the second case and through the window for the second display provided in the outer face of the case. The structure in which only a unitary display device is disposed in the case
15 allows a thinner design of the case which is provided with displays on the inner and outer faces.

[0024]

According to the portable radio communication apparatus of claim 3, the reflective plates provide extremely fine
20 display on the unitary display device through each of the windows in the inner and outer faces.

[Brief Description of the Drawings]

[Fig. 1] A perspective view of a portable radio communication apparatus describing the constitution and
25 structure of the portable radio communication apparatus according to an embodiment of the present invention.

[Fig. 2] A perspective view of a portable radio

communication apparatus which is folded describing the constitution and structure of the portable radio communication apparatus according to an embodiment of the present invention.

[Fig. 3] A functional block diagram describing functions of a portable radio communication apparatus according to the first embodiment of the present invention.

[Brief Description of the Reference Symbols]

- 1 Portable radio communication apparatus
- 2 First case
- 10 4 Second case
- 11 Main display section (first display)
- 11a Window for the main display section (window for the first display)
- 12 Sub-display section (second display)
- 15 12a Window for the sub-display section (window for the second display)
- 13 Speaker (sound output device)
- 14 Operation keys (input device)
- 15 Microphone (sound input device)
- 20 21 Display device
- 22 Reflective plate for main display section
- 23 Reflective plate for the sub-display section
- 25 Radio section (communication device)

[Document Type] Drawing

[Fig. 1]

[Document Type] Drawing

[Fig. 2]

[Document Type] Drawing

[Fig. 3]

- 25 Control section
- 26 Radio section
- 5 27 Battery

[Document Type] Abstract

[Abstract].

[Problem to be Solved by the Invention] To allow a smaller and thinner design of a portable radio communication apparatus which allows a user to check the display even when the apparatus is folded.

[Means for Solving the Problem] A second case 4 is connected to a first case 2 so as to be openable and closable. A display device 21 capable of displaying on both a front side and a back side is disposed in the second case 4. A window 11a for the main display section is formed in the front surface of the second case 4, and window 12a for the sub-display section is formed in the back surface. A reflective plate 22 for the main display section and a reflective plate 23 for the sub-display section are provided on the opposite sides of the window 11a for the main display section and the window 12a for the sub-display section, respectively.

[Elected Drawing] Fig. 3

FIG. 1

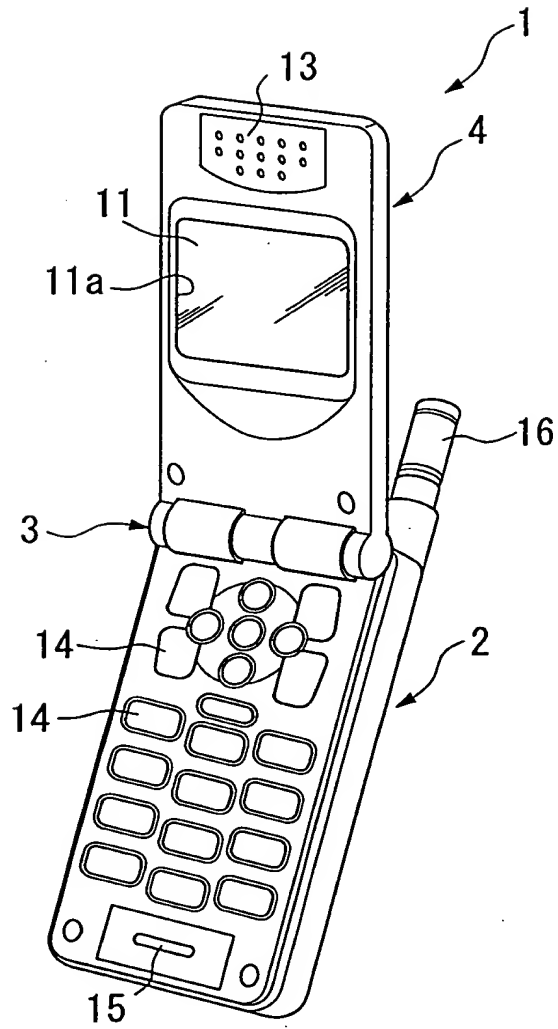


FIG. 2

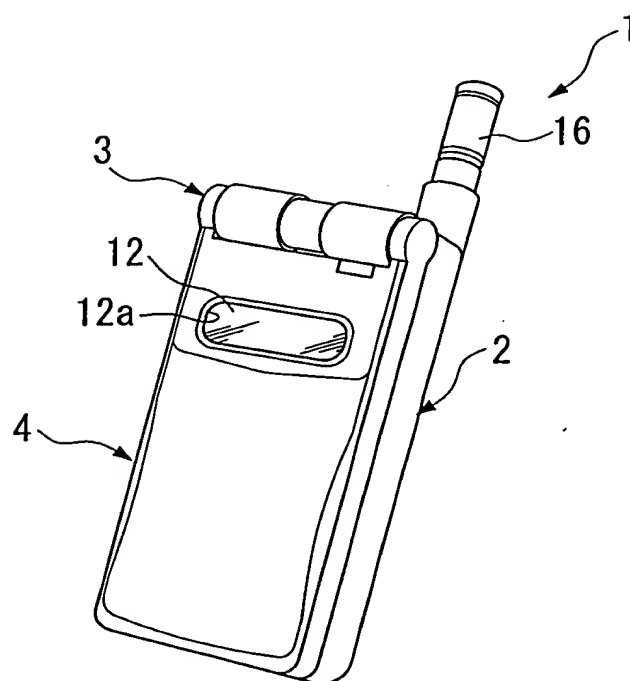


FIG. 3

